FIG. 1

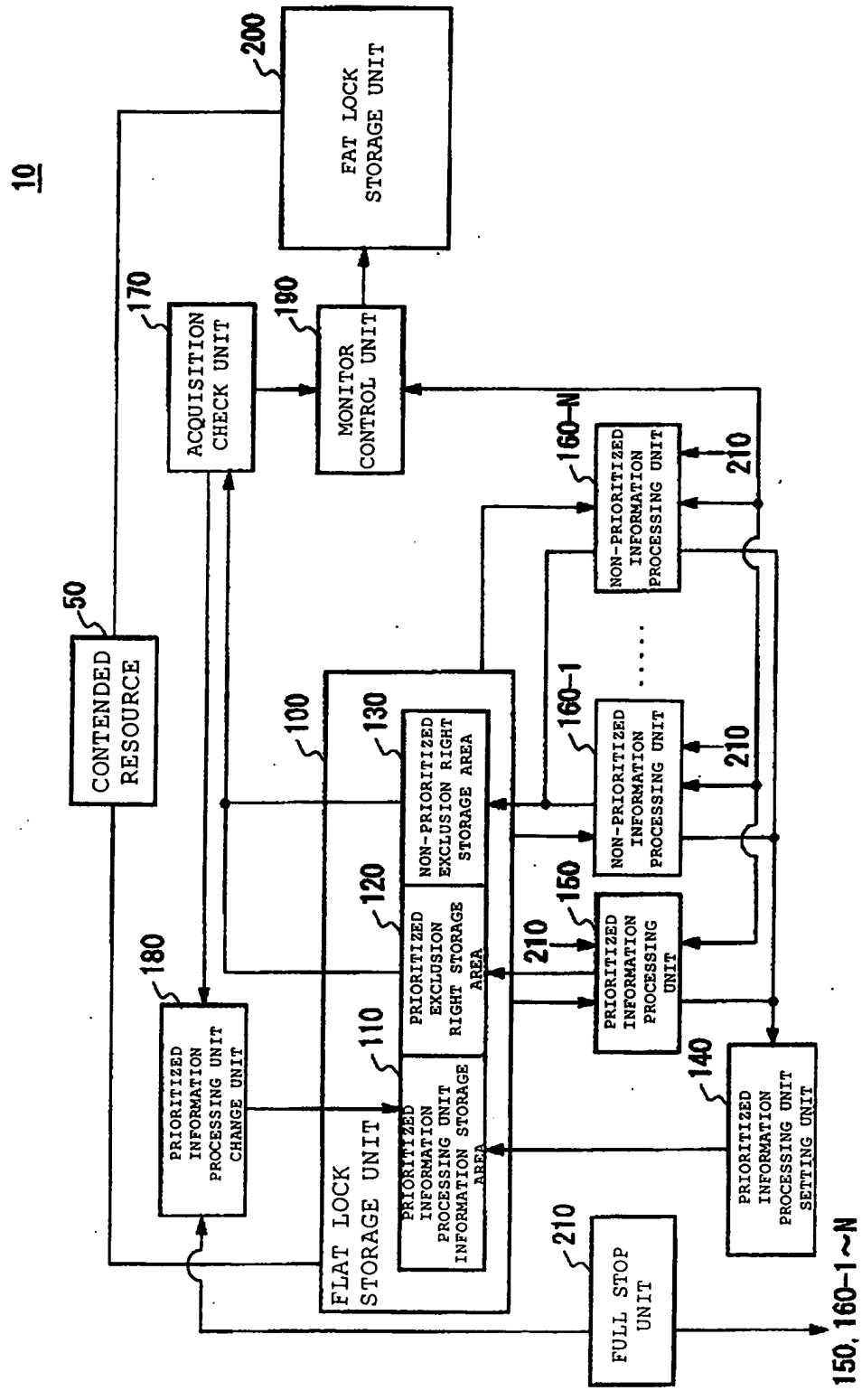

10
200
FAT LOCK STORAGE UNIT
170
ACQUISITION CHECK UNIT
190
MONITOR CONTROL UNIT
50
CONTENDED RESOURCE
100
130
NON-PRIORITIZED EXCLUSION RIGHT STORAGE AREA
120
PRIORITIZED EXCLUSION RIGHT STORAGE AREA
110
PRIORITIZED INFORMATION PROCESSING UNIT INFORMATION STORAGE AREA
FLAT LOCK STORAGE UNIT
180
PRIORITIZED INFORMATION PROCESSING UNIT CHANGE UNIT
160-N
NON-PRIORITIZED INFORMATION PROCESSING UNIT
160-1
NON-PRIORITIZED INFORMATION PROCESSING UNIT
150
PRIORITIZED INFORMATION PROCESSING UNIT
140
PRIORITIZED INFORMATION PROCESSING UNIT SETTING UNIT
210
FULL STOP UNIT
210
210
210
150, 160-1~N

FIG.2

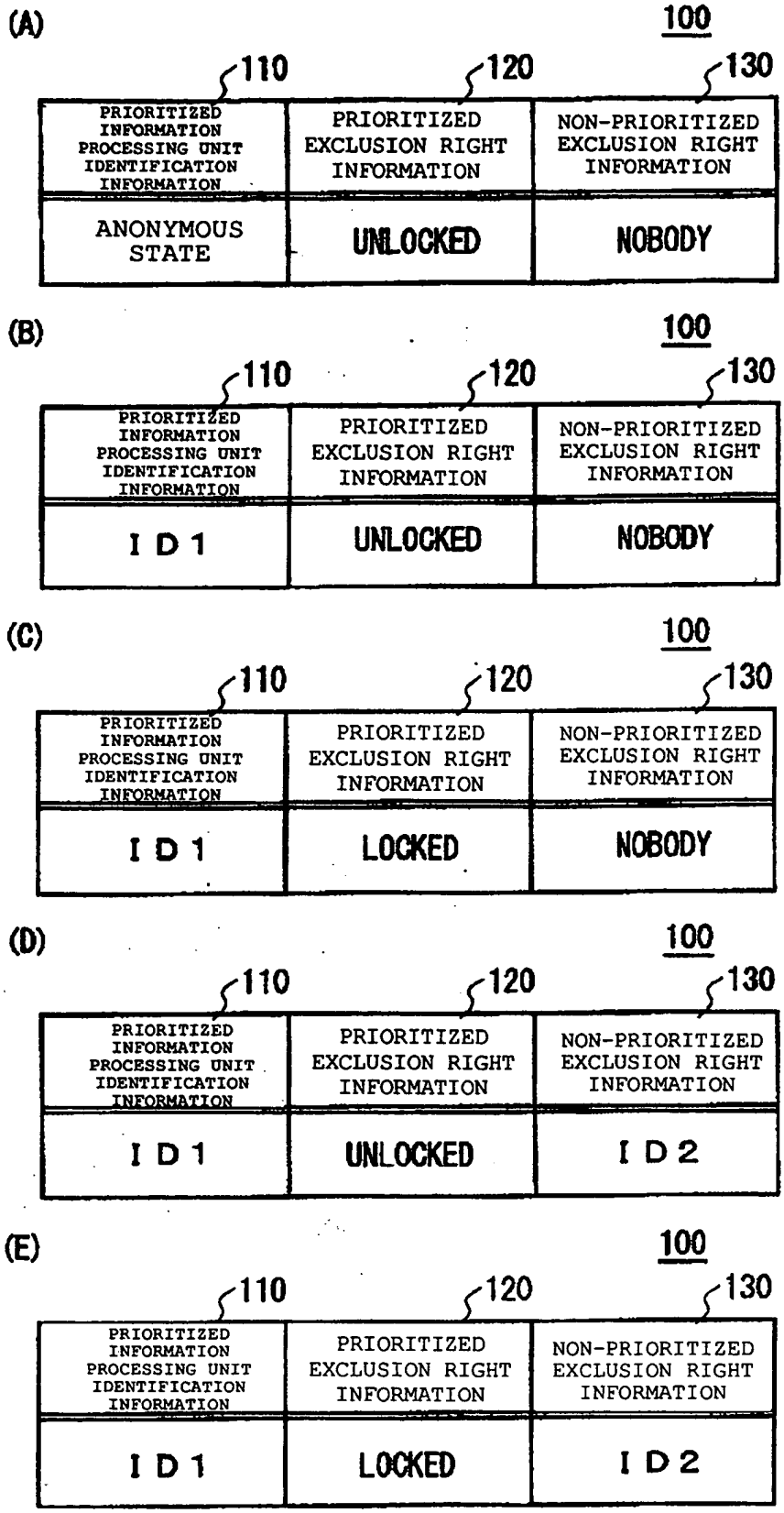

(A)
100
110
120
130
PRIORITIZED INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
PRIORITIZED EXCLUSION RIGHT INFORMATION
NON-PRIORITIZED EXCLUSION RIGHT INFORMATION
ANONYMOUS STATE
UNLOCKED
NOBODY
(B)
100
110
120
130
PRIORITIZED INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
PRIORITIZED EXCLUSION RIGHT INFORMATION
NON-PRIORITIZED EXCLUSION RIGHT INFORMATION
ID1
UNLOCKED
NOBODY
(C)
100
110
120
130
PRIORITIZED INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
PRIORITIZED EXCLUSION RIGHT INFORMATION
NON-PRIORITIZED EXCLUSION RIGHT INFORMATION
ID1
LOCKED
NOBODY
(D)
100
110
120
130
PRIORITIZED INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
PRIORITIZED EXCLUSION RIGHT INFORMATION
NON-PRIORITIZED EXCLUSION RIGHT INFORMATION
ID1
UNLOCKED
ID2
(E)
100
110
120
130
PRIORITIZED INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
PRIORITIZED EXCLUSION RIGHT INFORMATION
NON-PRIORITIZED EXCLUSION RIGHT INFORMATION
ID1
LOCKED
ID2

FIG.3

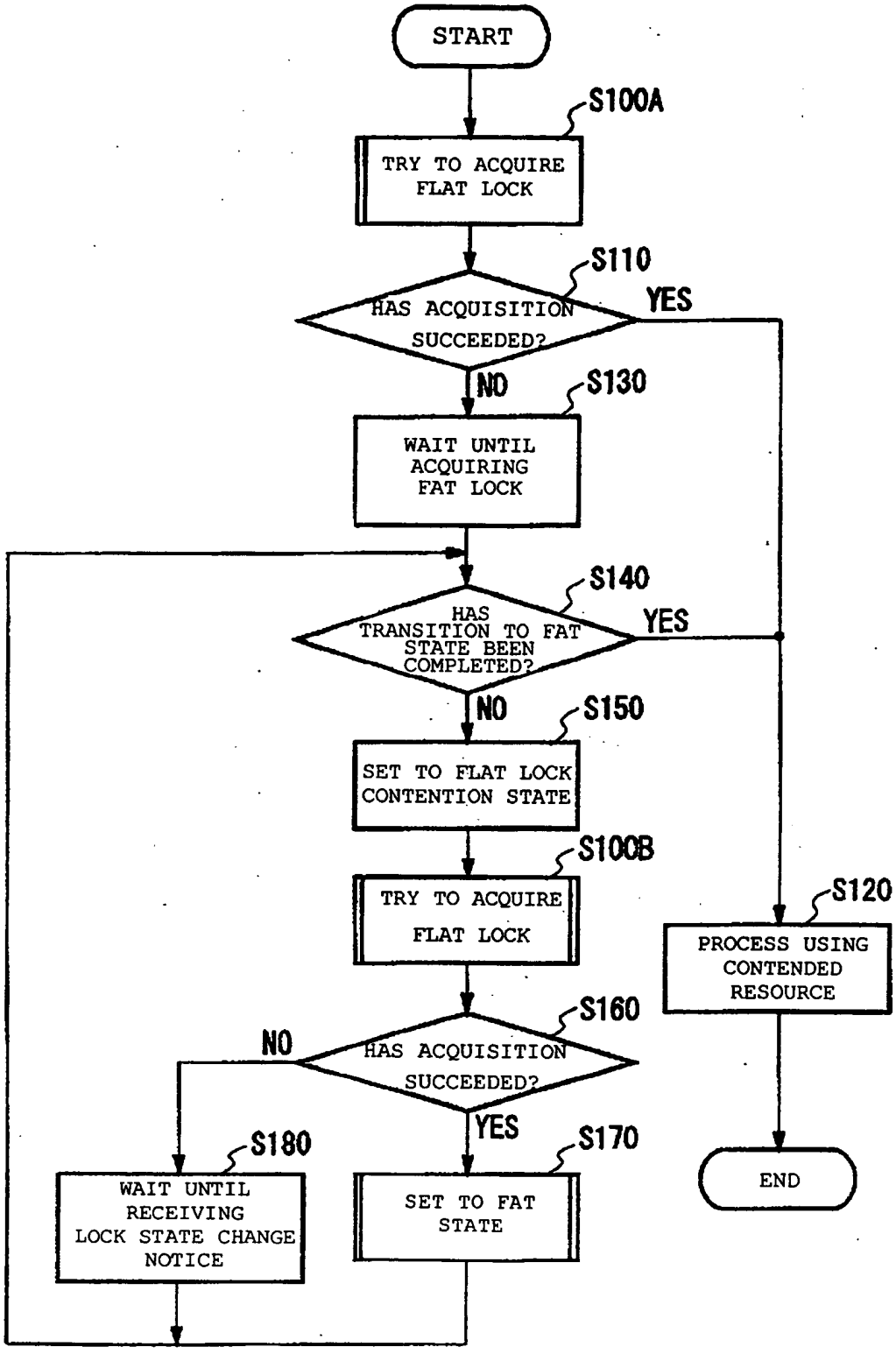

START
S100A
TRY TO ACQUIRE FLAT LOCK
S110
HAS ACQUISITION SUCCEEDED?
YES
NO
S130
WAIT UNTIL ACQUIRING FAT LOCK
S140
HAS TRANSITION TO FAT STATE BEEN COMPLETED?
YES
NO
S150
SET TO FLAT LOCK CONTENTION STATE
S100B
TRY TO ACQUIRE FLAT LOCK
S120
PROCESS USING CONTENDED RESOURCE
S160
HAS ACQUISITION SUCCEEDED?
NO
YES
S180
WAIT UNTIL RECEIVING LOCK STATE CHANGE NOTICE
S170
SET TO FAT STATE
END

FIG. 4

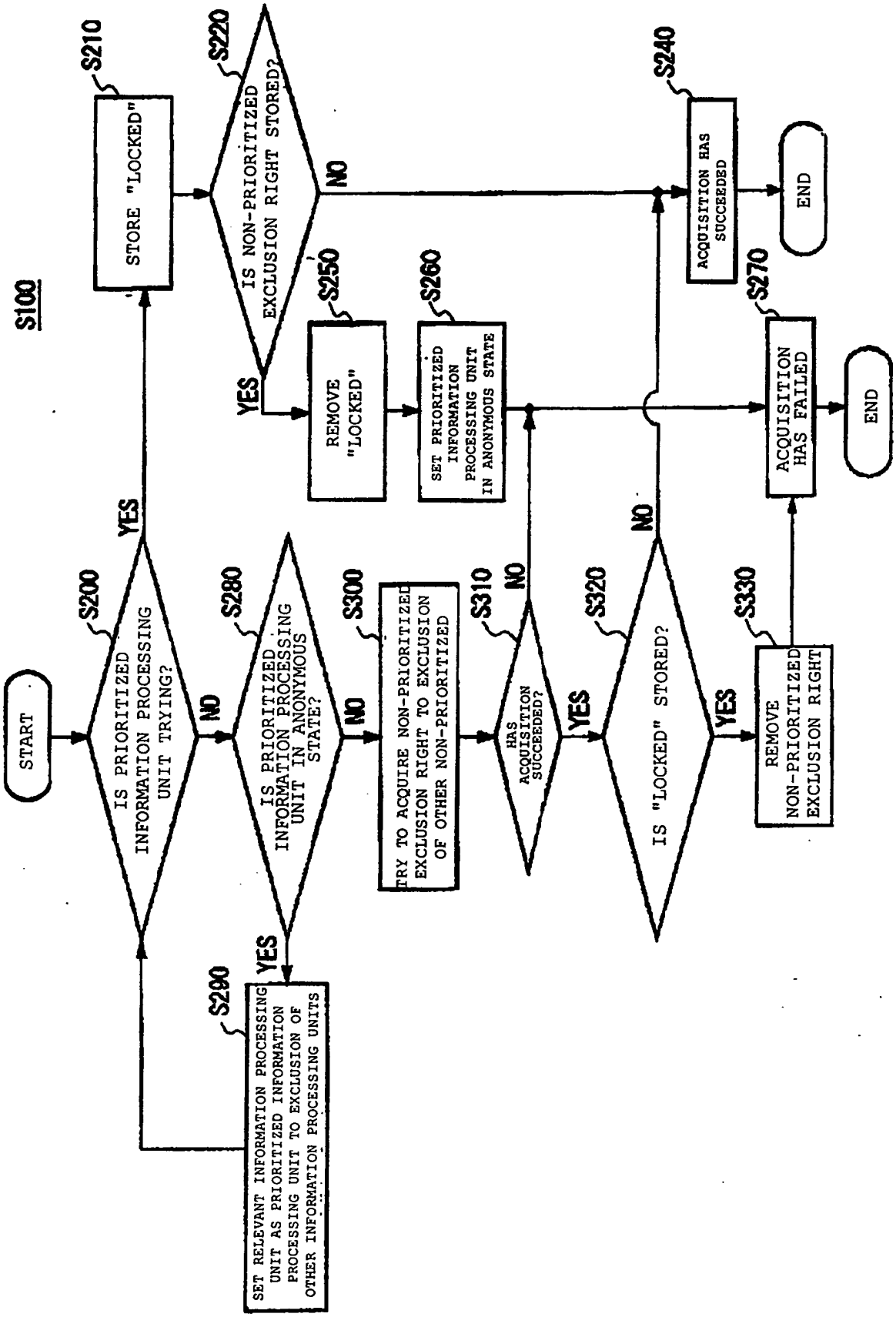

S100
START
S200
IS PRIORITIZED INFORMATION PROCESSING UNIT TRYING?
YES
NO
S210
STORE "LOCKED"
S220
IS NON-PRIORITIZED EXCLUSION RIGHT STORED?
YES
NO
S240
ACQUISITION HAS SUCCEEDED
END
S250
REMOVE "LOCKED"
S260
SET PRIORITIZED INFORMATION PROCESSING UNIT IN ANONYMOUS STATE
S270
ACQUISITION HAS FAILED
END
S280
IS PRIORITIZED INFORMATION PROCESSING UNIT IN ANONYMOUS STATE?
YES
NO
S290
SET RELEVANT INFORMATION PROCESSING UNIT AS PRIORITIZED INFORMATION PROCESSING UNIT TO EXCLUSION OF OTHER INFORMATION PROCESSING UNITS
S300
TRY TO ACQUIRE NON-PRIORITIZED EXCLUSION RIGHT TO EXCLUSION OF OTHER NON-PRIORITIZED
S310
HAS ACQUISITION SUCCEEDED?
NO
YES
S320
IS "LOCKED" STORED?
NO
YES
S330
REMOVE NON-PRIORITIZED EXCLUSION RIGHT

FIG.5

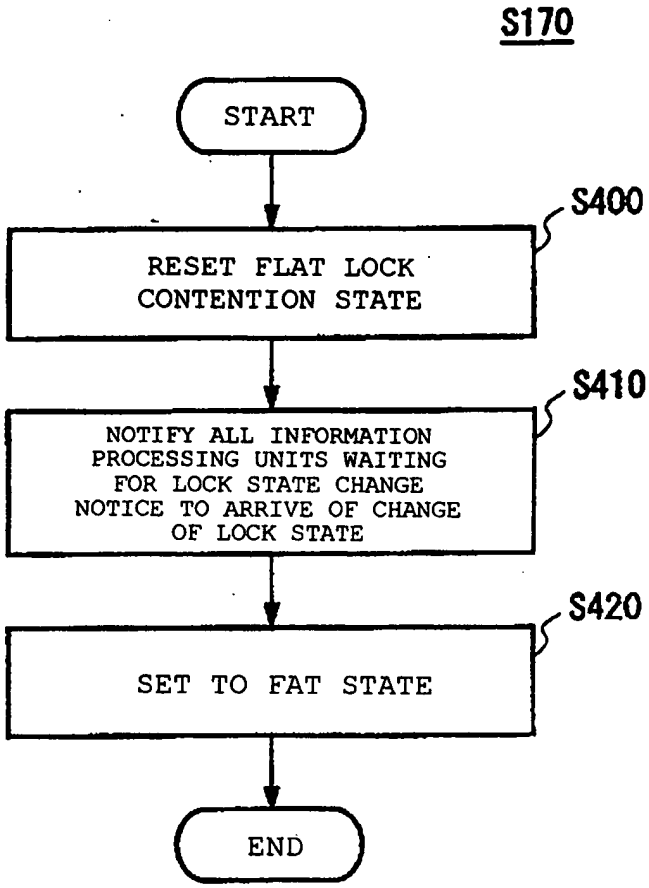

S170
START
S400
RESET FLAT LOCK CONTENTION STATE
S410
NOTIFY ALL INFORMATION PROCESSING UNITS WAITING FOR LOCK STATE CHANGE NOTICE TO ARRIVE OF CHANGE OF LOCK STATE
S420
SET TO FAT STATE
END

FIG. 6

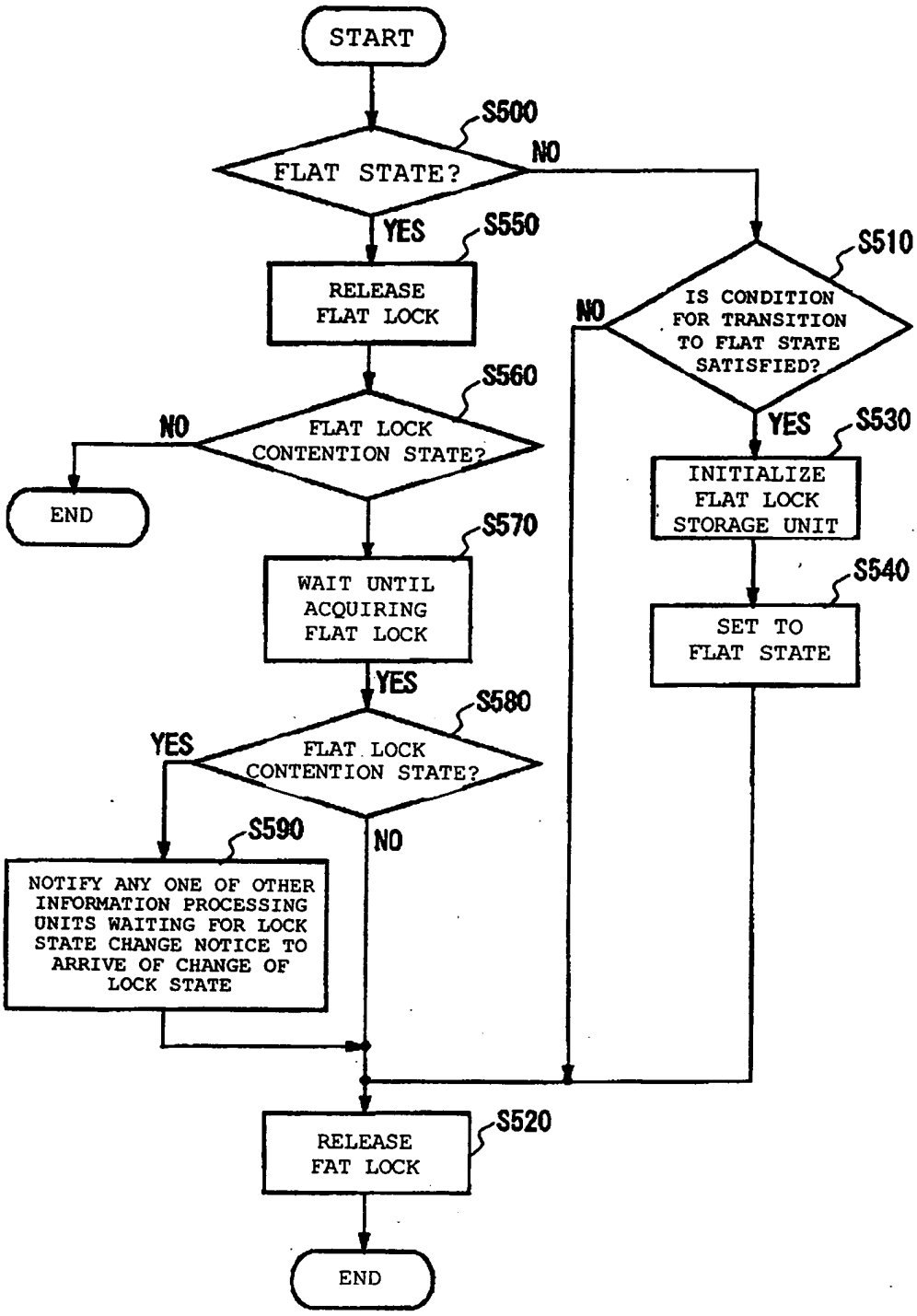

START
S500
FLAT STATE?
NO
YES
S550
RELEASE FLAT LOCK
S560
NO
FLAT LOCK CONTENTION STATE?
END
S570
WAIT UNTIL ACQUIRING FLAT LOCK
YES
S580
YES
FLAT LOCK CONTENTION STATE?
NO
S590
NOTIFY ANY ONE OF OTHER INFORMATION PROCESSING UNITS WAITING FOR LOCK STATE CHANGE NOTICE TO ARRIVE OF CHANGE OF LOCK STATE
S510
NO
IS CONDITION FOR TRANSITION TO FLAT STATE SATISFIED?
YES
S530
INITIALIZE FLAT LOCK STORAGE UNIT
S540
SET TO FLAT STATE
RELEASE FAT LOCK
S520
END

FIG. 7

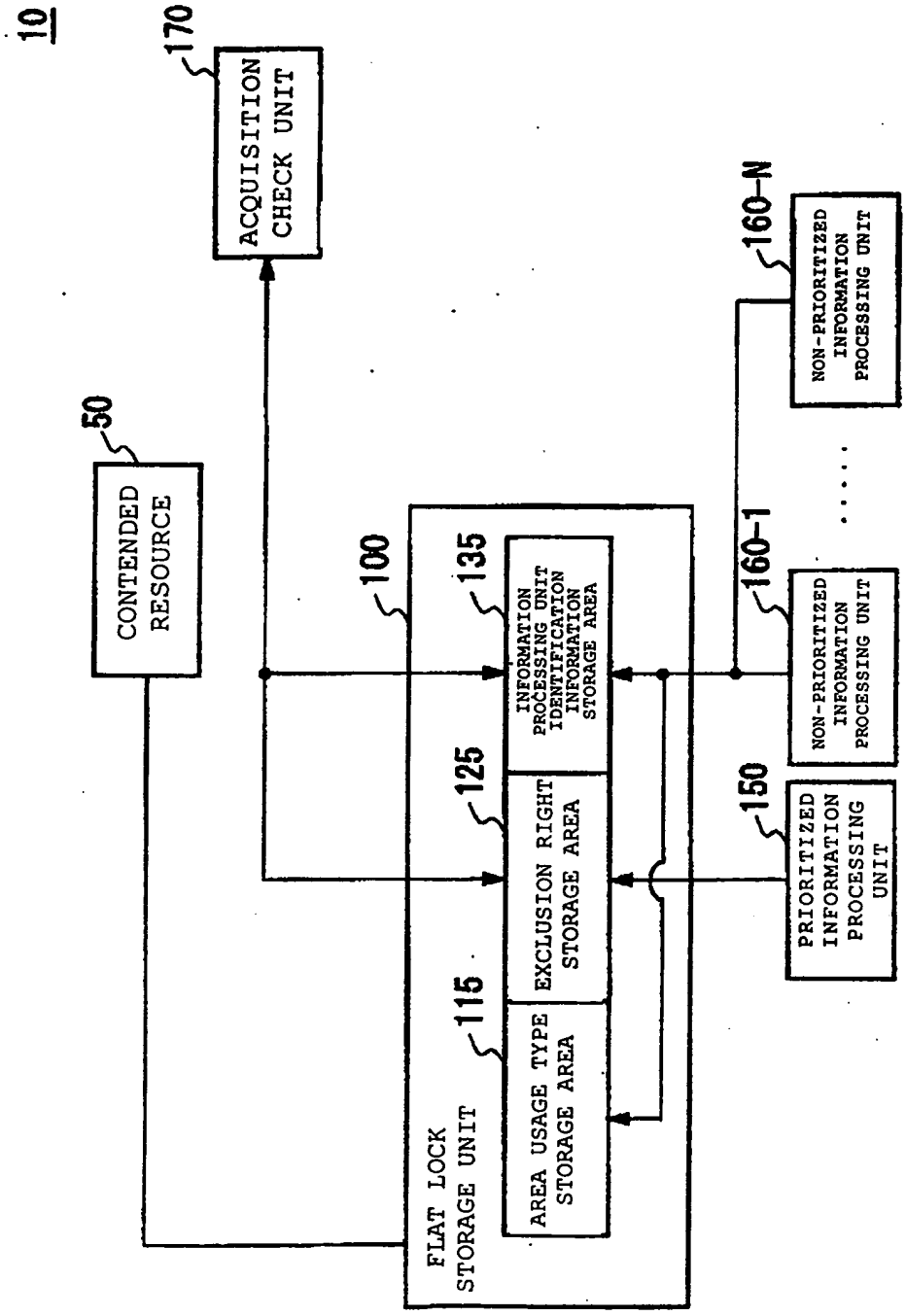

10
170
ACQUISITION CHECK UNIT
50
CONTENDED RESOURCE
100
135
INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION STORAGE AREA
125
EXCLUSION RIGHT STORAGE AREA
115
AREA USAGE TYPE STORAGE AREA
FLAT LOCK STORAGE UNIT
150
PRIORITIZED INFORMATION PROCESSING UNIT
160-1
NON-PRIORITIZED INFORMATION PROCESSING UNIT
160-N
NON-PRIORITIZED INFORMATION PROCESSING UNIT

FIG.8

(A)

100

115 AREA USAGE TYPE	125 EXCLUSION RIGHT	135 INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
PRIORITIZED INFORMATION PROCESSING UNIT	UNLOCKED	I D 1

(B)

100

115 AREA USAGE TYPE	125 EXCLUSION RIGHT	135 INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
PRIORITIZED INFORMATION PROCESSING UNIT	LOCKED	I D 1

(C)

100

115 AREA USAGE TYPE	125 EXCLUSION RIGHT	135 INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
NON-PRIORITIZED EXCLUSION RIGHT	LOCKED	I D 2

(D)

100

115 AREA USAGE TYPE	125 EXCLUSION RIGHT	135 INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION
NON-PRIORITIZED EXCLUSION RIGHT	UNLOCKED	NOBODY

FIG. 9

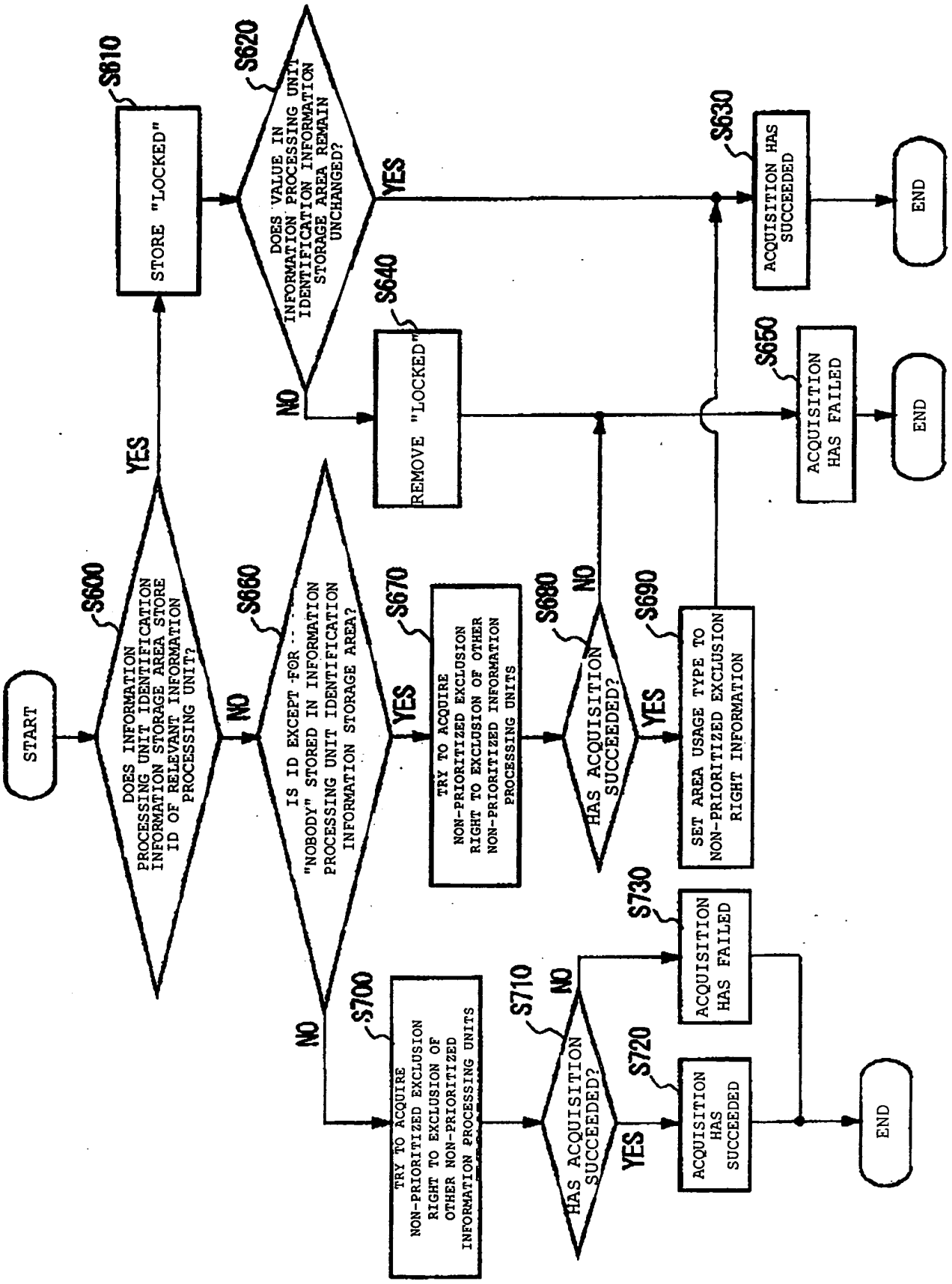

START
S600
DOES INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION STORAGE AREA STORE ID OF RELEVANT INFORMATION PROCESSING UNIT?
YES
NO
S610
STORE "LOCKED"
S620
DOES VALUE IN INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION STORAGE AREA REMAIN UNCHANGED?
YES
NO
S630
ACQUISITION HAS SUCCEEDED
END
S640
REMOVE "LOCKED"
S650
ACQUISITION HAS FAILED
END
S660
IS ID EXCEPT FOR "NOBODY" STORED IN INFORMATION PROCESSING UNIT IDENTIFICATION INFORMATION STORAGE AREA?
YES
NO
S670
TRY TO ACQUIRE NON-PRIORITIZED EXCLUSION RIGHT TO EXCLUSION OF OTHER NON-PRIORITIZED INFORMATION PROCESSING UNITS
S680
HAS ACQUISITION SUCCEEDED?
NO
YES
S690
SET AREA USAGE TYPE TO NON-PRIORITIZED EXCLUSION RIGHT INFORMATION
S700
TRY TO ACQUIRE NON-PRIORITIZED EXCLUSION RIGHT TO EXCLUSION OF OTHER NON-PRIORITIZED INFORMATION PROCESSING UNITS
S710
HAS ACQUISITION SUCCEEDED?
NO
YES
S720
ACQUISITION HAS SUCCEEDED
S730
ACQUISITION HAS FAILED
END

FIG.10

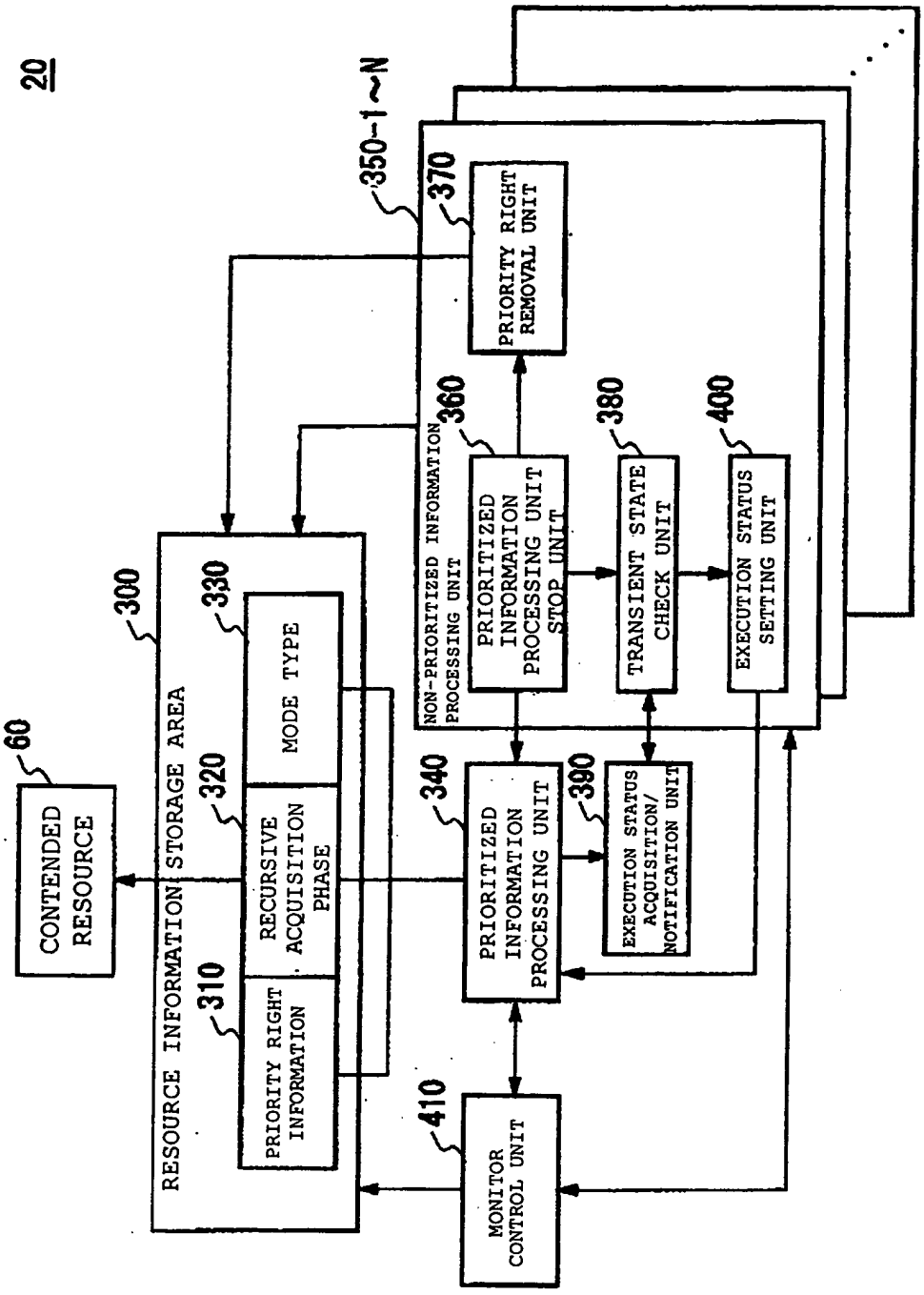

20
60
CONTENDED RESOURCE
300
RESOURCE INFORMATION STORAGE AREA
310
PRIORITY RIGHT INFORMATION
320
RECURSIVE ACQUISITION PHASE
330
MODE TYPE
350-1~N
NON-PRIORITIZED INFORMATION PROCESSING UNIT
360
PRIORITIZED INFORMATION PROCESSING UNIT STOP UNIT
370
PRIORITY RIGHT REMOVAL UNIT
380
TRANSIENT STATE CHECK UNIT
390
EXECUTION STATUS ACQUISITION/ NOTIFICATION UNIT
400
EXECUTION STATUS SETTING UNIT
340
PRIORITIZED INFORMATION PROCESSING UNIT
410
MONITOR CONTROL UNIT

FIG.11

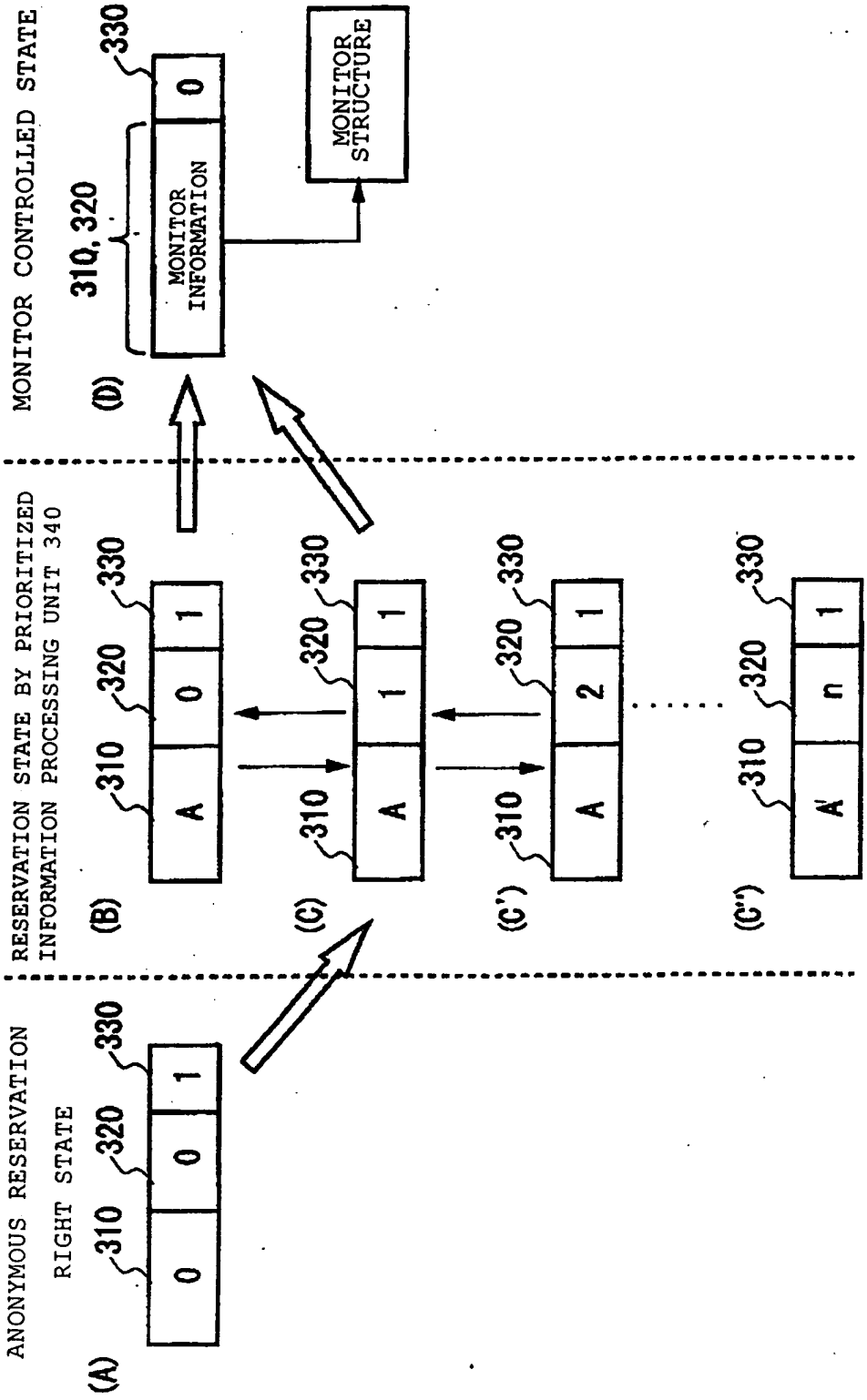

ANONYMOUS RESERVATION RIGHT STATE
RESERVATION STATE BY PRIORITIZED INFORMATION PROCESSING UNIT 340
MONITOR CONTROLLED STATE
(A)
(B)
(C)
(C')
(C'')
(D)
310
320
330
310, 320
0
1
A
A'
2
n
MONITOR INFORMATION
MONITOR STRUCTURE

FIG.12

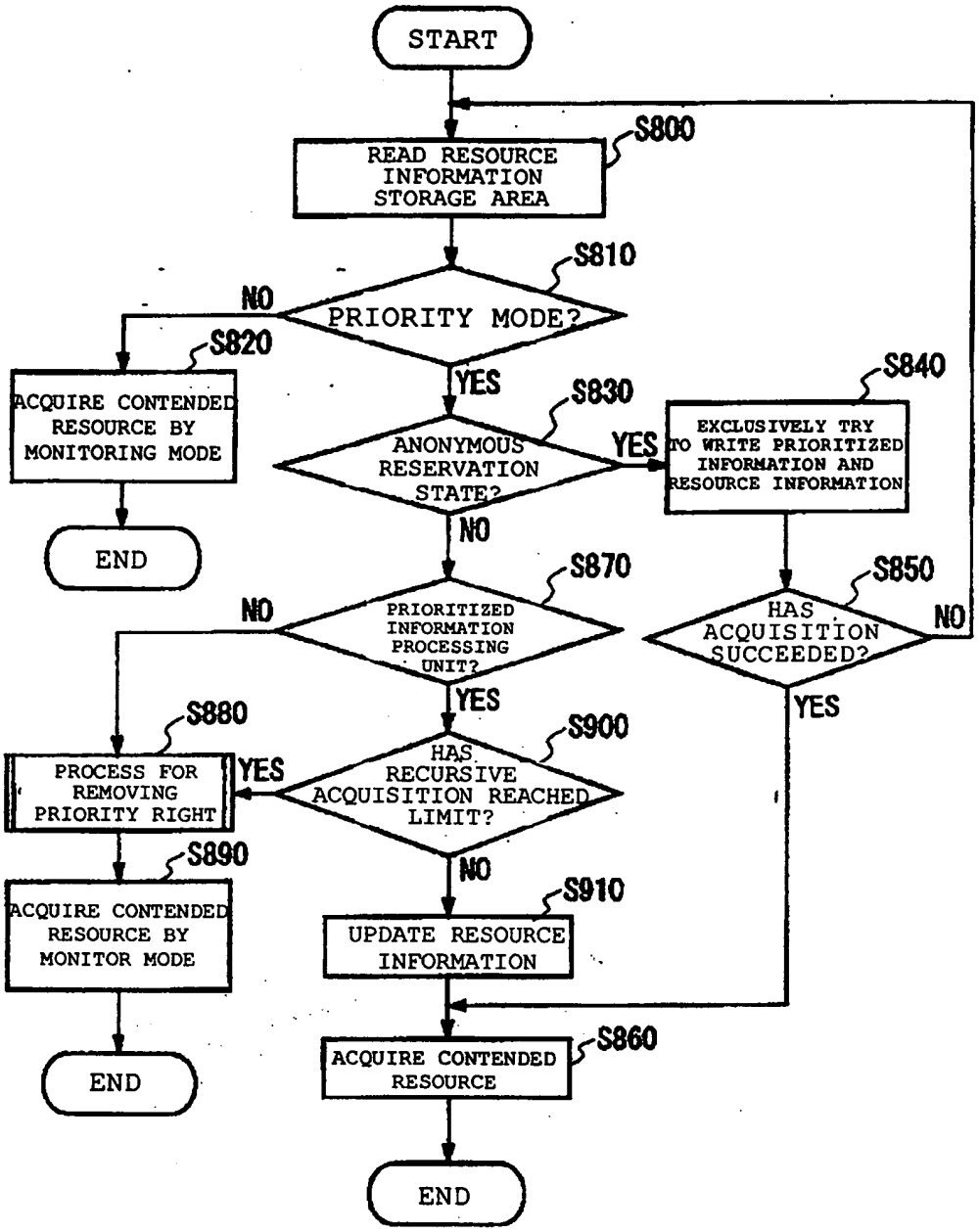

START
READ RESOURCE INFORMATION STORAGE AREA
S800
PRIORITY MODE?
S810
NO
YES
ACQUIRE CONTENDED RESOURCE BY MONITORING MODE
S820
END
ANONYMOUS RESERVATION STATE?
S830
YES
NO
EXCLUSIVELY TRY TO WRITE PRIORITIZED INFORMATION AND RESOURCE INFORMATION
S840
HAS ACQUISITION SUCCEEDED?
S850
NO
YES
PRIORITIZED INFORMATION PROCESSING UNIT?
S870
NO
YES
PROCESS FOR REMOVING PRIORITY RIGHT
S880
YES
HAS RECURSIVE ACQUISITION REACHED LIMIT?
S900
NO
ACQUIRE CONTENDED RESOURCE BY MONITOR MODE
S890
END
UPDATE RESOURCE INFORMATION
S910
ACQUIRE CONTENDED RESOURCE
S860
END

FIG.13

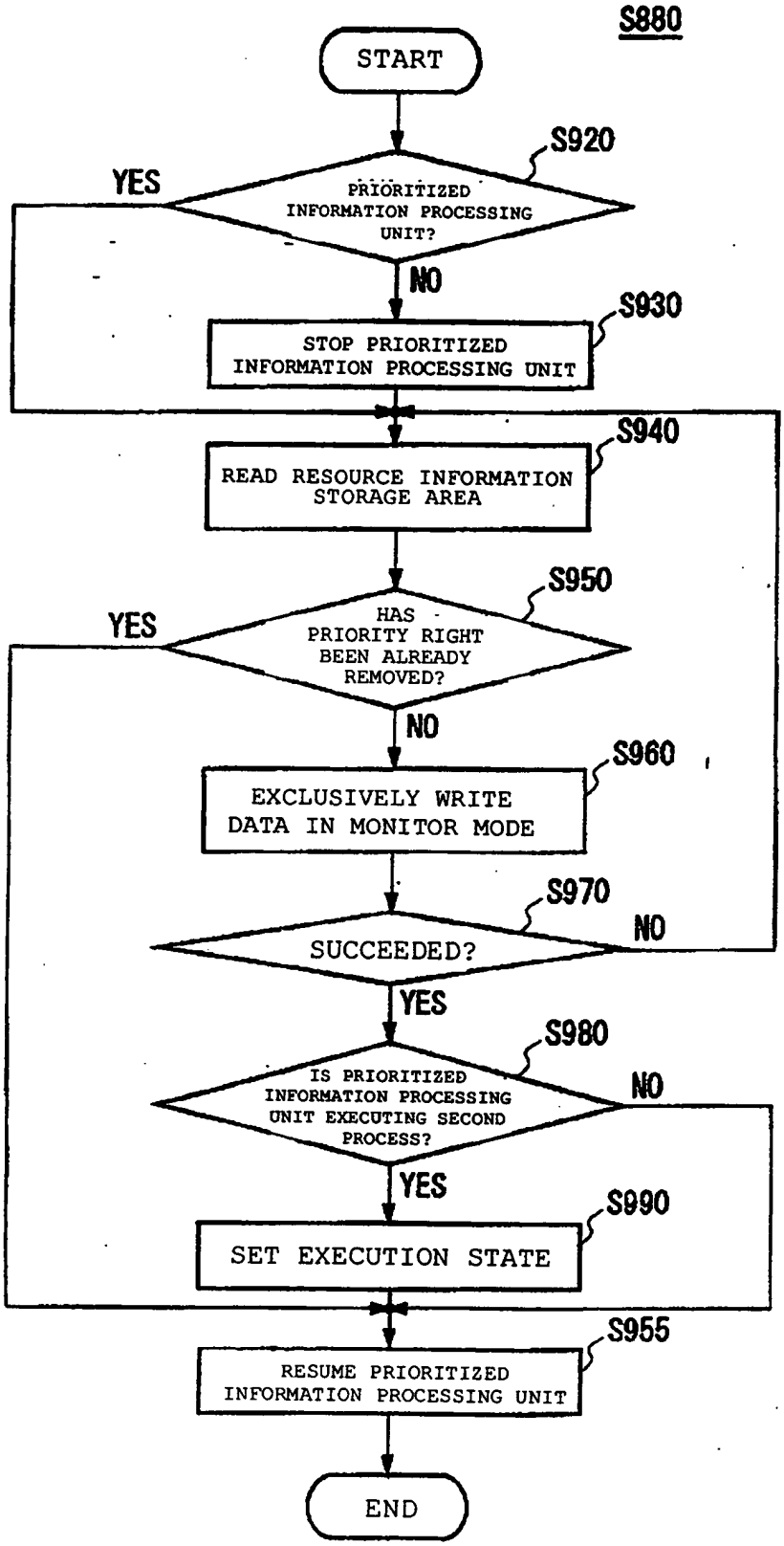

S880
START
S920
PRIORITIZED INFORMATION PROCESSING UNIT?
YES
NO
S930
STOP PRIORITIZED INFORMATION PROCESSING UNIT
S940
READ RESOURCE INFORMATION STORAGE AREA
S950
HAS PRIORITY RIGHT BEEN ALREADY REMOVED?
YES
NO
S960
EXCLUSIVELY WRITE DATA IN MONITOR MODE
S970
SUCCEEDED?
NO
YES
S980
IS PRIORITIZED INFORMATION PROCESSING UNIT EXECUTING SECOND PROCESS?
NO
YES
S990
SET EXECUTION STATE
S955
RESUME PRIORITIZED INFORMATION PROCESSING UNIT
END

FIG.14

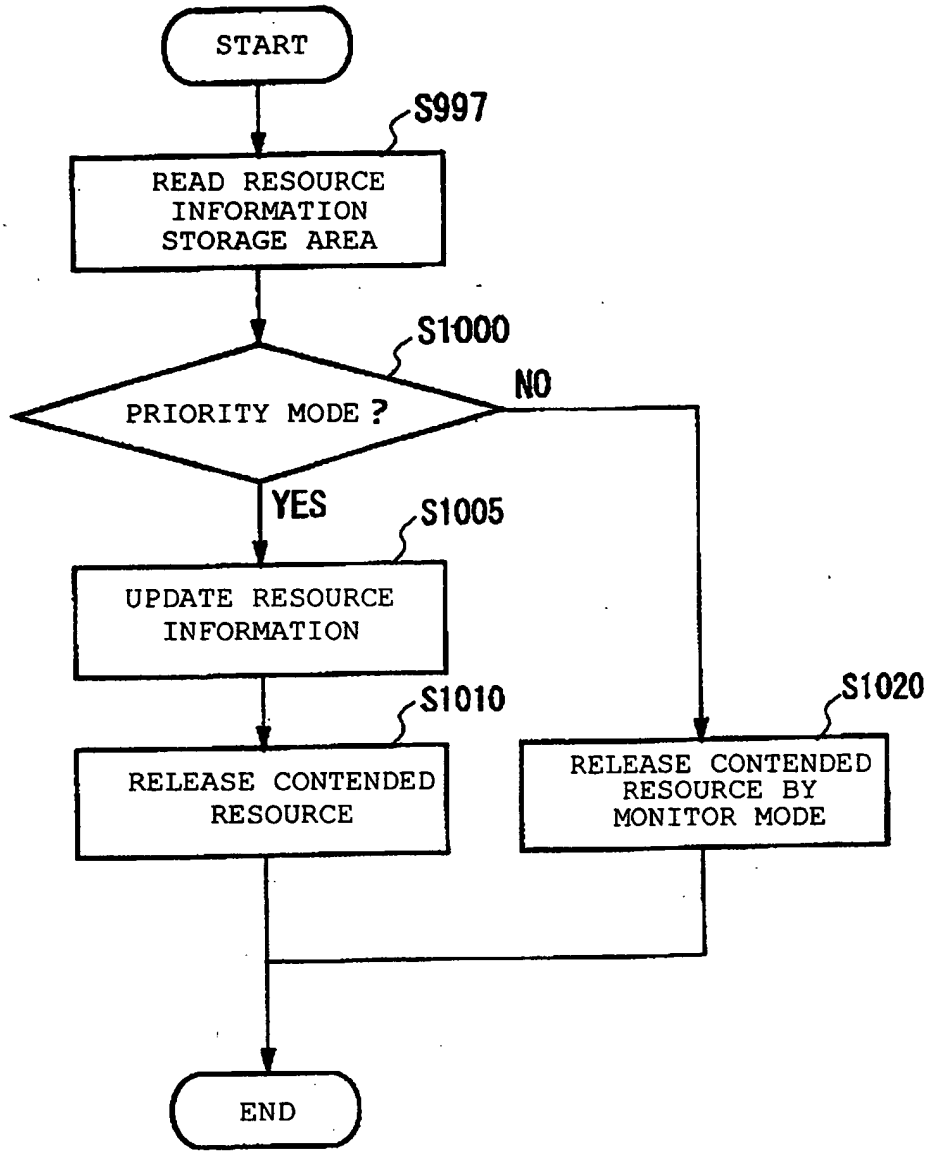

START
S997
READ RESOURCE INFORMATION STORAGE AREA
S1000
PRIORITY MODE ?
NO
YES
S1005
UPDATE RESOURCE INFORMATION
S1010
RELEASE CONTENDED RESOURCE
S1020
RELEASE CONTENDED RESOURCE BY MONITOR MODE
END

FIG.15

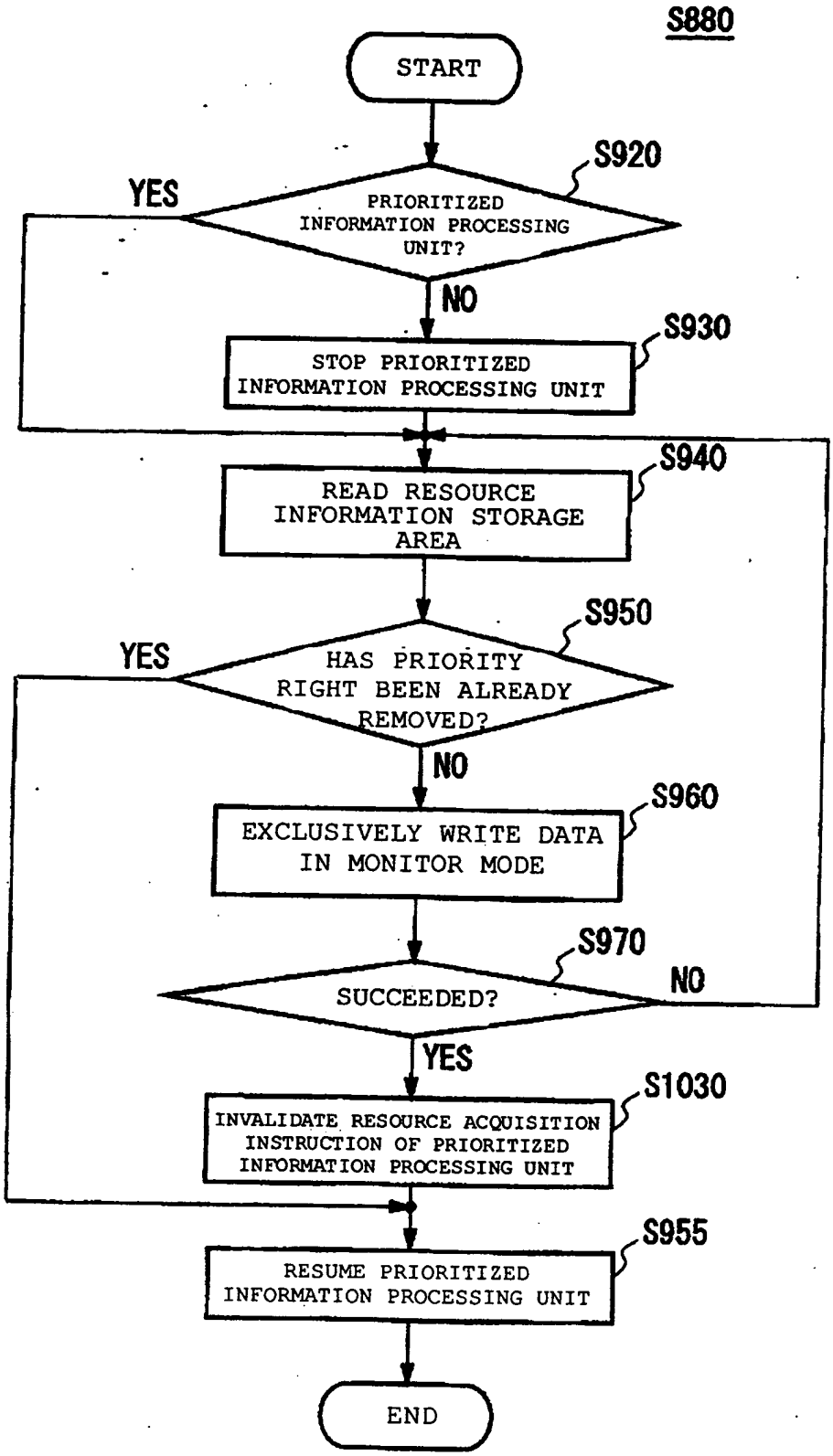
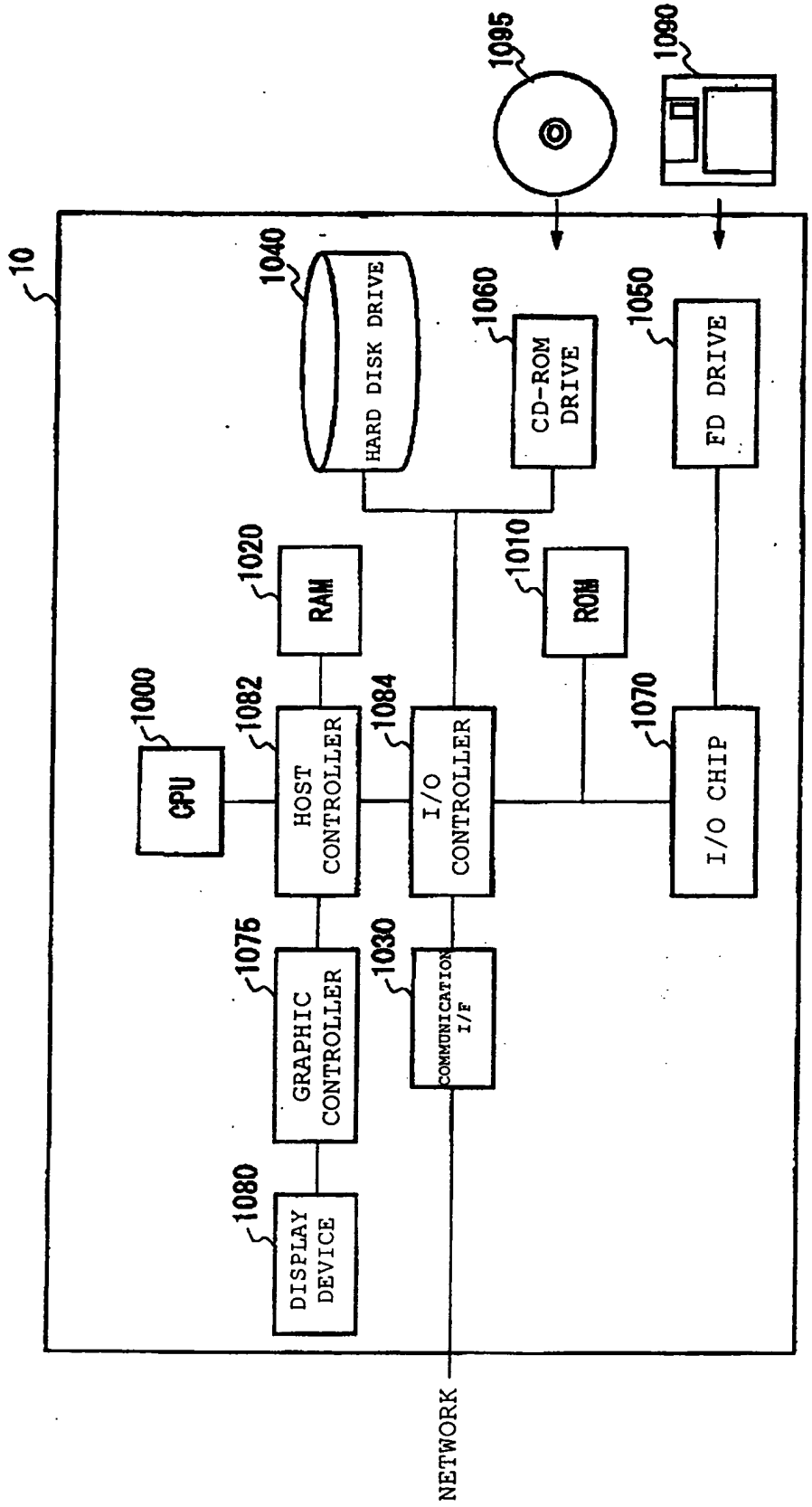

S880
START
S920
YES
PRIORITIZED INFORMATION PROCESSING UNIT?
NO
S930
STOP PRIORITIZED INFORMATION PROCESSING UNIT
S940
READ RESOURCE INFORMATION STORAGE AREA
S950
YES
HAS PRIORITY RIGHT BEEN ALREADY REMOVED?
NO
S960
EXCLUSIVELY WRITE DATA IN MONITOR MODE
S970
SUCCEEDED?
NO
YES
S1030
INVALIDATE RESOURCE ACQUISITION INSTRUCTION OF PRIORITIZED INFORMATION PROCESSING UNIT
S955
RESUME PRIORITIZED INFORMATION PROCESSING UNIT
END

FIG.16


10
1095
1090
1040
HARD DISK DRIVE
1060
CD-ROM DRIVE
1050
FD DRIVE
1020
RAM
1010
ROM
1000
CPU
1082
HOST CONTROLLER
1084
I/O CONTROLLER
1070
I/O CHIP
1075
GRAPHIC CONTROLLER
1030
COMMUNICATION I/F
1080
DISPLAY DEVICE
NETWORK